

WHAT IS CLAIMED IS:

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1. An antenna coupling apparatus comprising:  
a first antenna installed to a portable radio terminal;  
a second antenna differing from said first antenna together;  
an electromagnetic coupling element consisting of a  
conductor that is electromagnetically couples said first and said  
second antennas together; and  
a ground conductor element for reflecting the power  
transmitted or received by said first antenna toward said  
electromagnetic coupling element.
2. The antenna coupling apparatus according to claim 1, wherein  
said electromagnetic coupling element and said ground conductor  
element are open at the top like a letter of the alphabet U, or  
are of ring or U shape having a width in the X direction.
3. The antenna coupling apparatus according to claim 1, wherein  
said first antenna and said second antenna are  
electromagnetically coupled together, using a plurality of said  
electromagnetic coupling elements and/or said ground conductor  
elements.
4. The antenna coupling apparatus according to claim 1,  
comprising a matching circuit that matches said first antenna  
with said second antenna.
5. The antenna coupling apparatus according to claim 1, wherein  
said electromagnetic coupling elements and said ground conductor  
elements are disposed at any plurality of positions, taken into

account the matching of said first antenna.

6. The antenna coupling apparatus according to claim 1, wherein a composite antenna consisting of a helical antenna and a monopole antenna is used as said first antenna.

7. An external-antenna connecting apparatus comprising:  
an antenna installed to a portable radio terminal;  
an external antenna coupled with said antenna;  
a body for securing said portable radio terminal to said body;

an electromagnetic coupling circuit disposed in said body, which circuit electromagnetically couples the antenna of said portable radio terminal and said external antenna together, being non-contact with said portable radio terminal with respect to DC components, when said portable radio terminal is secured to said body.

8. The external-antenna connecting apparatus according to claim 7, wherein said electromagnetic coupling circuit is fitted with a nonconducting cover.

9. The external-antenna connecting apparatus according to claim 7, wherein said electromagnetic coupling circuit has a U-shaped cross section corresponding to an electromagnetic coupling element and a ground conductor element.

10. The external-antenna connecting apparatus according to claim 7, said antenna connecting apparatus has a case for said portable

radio terminal, and is shaped to cover the part which includes the antenna of said portable radio terminal, and hold the entire portable radio terminal when fitted over the terminal to the case.

11. An onboard external-antenna connecting apparatus comprising:  
an antenna installed to a portable radio terminal;  
an external antenna connected to said antenna;  
an external power for supplying power to said portable radio terminal;

a body for securing said portable radio terminal to said body by positioning from above;

an electromagnetic coupling circuit disposed in said body, which circuit electromagnetically couples the antenna of said portable radio terminal and said external antenna together, being non-contact with said portable radio terminal with respect to DC components, when said portable radio terminal is positioned in said body from above; and

a connecting member for connecting said external power supply and said portable radio terminal together to supply power from said external power supply to said portable radio terminal.

12. The onboard external-antenna connecting apparatus according to claim 11, wherein:

a moving part operating in conjunction with the positioning of said portable radio terminal when said portable radio terminal is housed is disposed in said body, a first connector for feeding

power from said external power supply to said portable radio terminal is installed on said moving part; and

a second connector for feeding power from said external power supply when connected with said first connector is installed on said portable radio terminal.

13. The onboard external-antenna connecting apparatus according to claim 11, wherein said moving part is disposed at a predetermined angle to the side of the case, and can be moved by a spring between itself and the side of the case, so that said portable radio terminal is stably secured when installed in the onboard external-antenna connecting apparatus.

14. The onboard external-antenna connecting apparatus according to claim 11, wherein:

first metal pieces for feeding power from said external power supply to said portable radio terminal when said portable radio terminal is housed, are disposed in said body; and

second metal pieces for feeding power from said external power supply when connected with said first metal pieces are disposed in said portable radio terminal.

15. The onboard external-antenna connecting apparatus according to claim 11, wherein:

said first metal pieces and said second metal pieces, either one is protruded connectors and the other is recessed connectors matching with each other.

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